Triggering in Run-6

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Some observations from Run-5 Proton-Proton

Start 04-19-05 Run Number ~168915
End 05-31-05 Run Number ~176123

Trigger Configurations PPRun5 (40) - (47)

Complete success of ERT and MUID LL1 during Run-5 make our Run-6 job much easier.

One outstanding issue is readout of MUIDLL1 data into stream.

Example Run # 175640
Average BBCLL1>0 ~ 40kHz
DAQ Archive Rate ~ 4700 Hz

Name	Bit Mask	Scale Down	State	Raw Trigger Count	Live Trigger Count	Scaled Trigger Count
Clock	0x00000002	9999999	Enabled	793725459	-1687500929	1978
BBCLL1(>0 tubes)	0x00000004	11	Enabled	90811576	80687748	6723979
BBCLL1(noVertexCut)	0x00000008	800	Enabled	225764302	199953454	249629
ZDCLL1wide	0x00000010	8	Enabled	5385509	4818506	535389
ZDCLL1narrow	0x00000020	900	Enabled	2181957	1951758	2166
BBCLL1&(ZDCN|ZDCS)	0x00000040	19	Enabled	12940711	11575220	578761
ERTBLT_4x4c	0x00000080	9999999	Enabled	529120370	449061497	44
ERTLL1_2x2&BBCLL1	0x00000100	9999999	Enabled	58759034	52695216	5
ERTLL1_4x4a&BBCLL1	0x00000200	0	Enabled	174695	154528	154528
ERTLL1_4x4c	0x00000400	3500	Enabled	572058055	487933450	139369
ERTLL1_4x4b&BBCLL1	0x00000800	0	Enabled	50638	43311	43311
ERTLL1_4x4c&BBCLL1	0x00001000	0	Enabled	2207449	2002663	2002663
ERTLL1_E&BBCLL1	0x00002000	0	Enabled	406298	365908	365908

The rejection factor can be seen in
http://www.phenix.bnl.gov/WWW/trigger/pp/c-arm/Run3/run5_pp/performance.html
Though they varied (depend on warm channel?), rough values are
 4x4c (1.4GeV) : ~60
 4x4a (2.1GeV) : ~500
 4x4b (2.8GeV) : ~1800
 4x4b wo bbcll1 : ~600
 electron (0.4GeV) : ~200

Best regards,
Kensuke

MUIDLL1_N1D&BBCLL1	0x00004000	0	Enabled	302716	270428	270428
MUIDLL1_S1D&BBCLL1	0x00008000	0	Enabled	178630	159656	159656
MUIDLL1_N1S&BBCLL1	0x00010000	9999999	Enabled	1347208	1204804	0
MUIDLL1_S1S&BBCLL1	0x00020000	9999999	Enabled	1102754	985836	0
MUIDLL1_N1D1S&BBCLL1	0x00040000	0	Enabled	23751	21218	21218
MUIDLL1_S1D1S&BBCLL1	0x00080000	0	Enabled	6347	5655	5655
MUIDN_1D&BBCLL1	0x00100000	9999999	Enabled	346693	309959	0
MUIDS_1D&BBCLL1	0x00200000	9999999	Enabled	297346	265773	0
(Y+B+ + Y+B-)	0x00400000	9999999	Disabled	42926898	0	0
ZDCN||ZDCS	0x00800000	308	Enabled	80146550	71686973	231996
ZDCNS	0x01000000	8	Enabled	3492624	3105323	345035
RPC1&RPC2	0x02000000	0	Enabled	1456	1278	1278
RPC1||RPC2||SCINT_FWD	0x04000000	1250	Enabled	1401885	1243629	994
ERTLL1_4x4b	0x08000000	0	Enabled	160615	99852	99852
PPG(Pedestal)	0x10000000	0	Enabled	2360	2145	2145
PPG(Test Pulse)	0x20000000	0	Enabled	4721	4290	4290
PPG(Laser)	0x40000000	0	Enabled	4720	4261	4261
Noise	0x80000000	0	Disabled	490146794	0	0

MUID North 1 Deep - Rejection ~ 700
MUID South 1 Deep - Rejection ~ 1000

MUID North 1 Shallow - Rejection ~ 160
MUID South 1 Shallow - Rejection ~ 197

In some runs these rejections are somewhat worse....

General Points:

Currently we can archive ~ 5-6 kHz.
We do not plan to use Level-2 triggering in Run-6.
We will use the Level-2 framework for filtering, but not triggering.

One limit around 6 kHz is in the DAQ DCM due to Pad Chamber unzerosuppresable packets with disconnected bits on. Is there any reason to work on this for this run?

Last run a big strategy was to record every possible low pT pizero for A_LL. ERT 4x4c (1.4 GeV threshold) had a rejection of ~ 60. Thus, if BBCLL1 is 60 kHz, this give a rate 1kHz. If we have a BBCLL1 rate 5 x higher = 300 kHz, then this trigger uses 5 kHz (full bandwidth).

Extra triggers for MPC et al. need accounting.